

## Patent claims

1. Specific magnetosomes consisting of a magnetic iron oxide magnetite  $\text{Fe}_3\text{O}_4$  monocrystal with a diameter  $\leq 45$  nm and a phospholipid membrane surrounding this crystal.

2. Magnetosomes according to claim 1 wherein the membrane consists of phosphatidyl ethanolamine, phosphatidyl glycerol and phosphatidyl choline where mainly the fatty acids palmitic acid, palmitoleic acid and oleic acid are contained.

3. Magnetosomes according to claims 1 and 2 wherein the membrane consists of  $53 \pm 6$  % phosphatidyl ethanolamine,  $38 \pm 6$  % phosphatidyl glycerol and  $8.9 \pm 5$  % phosphatidyl choline.

4. Magnetosomes according to claims 1 to 3 wherein they exist mainly as chains up to 100, suitably 10-60 magnetosomes and with a cationic surface charge.

5. Magnetosomes according to claims 1 to 4 wherein additionally antibodies or therapeutic agents, if necessary through respective reactive groups, are bound to the magnetosome membrane.

6. Magnetosomes according to claims 1 to 5 wherein they are contained packed in liposomes.

7. Magnetosomes according to claims 1 to 6 wherein they are contained packed in classical liposomes, stealth liposomes, micellar systems, immunoliposomes, cationic liposomes or fusogenic liposomes.

8. Magnetosomes according to claims 1 - 4 and 6 - 7 wherein they show additionally specific antibodies chemically coupled to their surface.

9. Magnetosomes according to claims 1 - 4 and 6 - 7 wherein they contain additionally one or a few therapeutic agents enclosed (encapsulated).

10. Magnetosomes according to claims 1 - 4 and 6 - 7 wherein they contain additionally radionuclides enclosed (encapsulated).

11. Magnetosomes according to claims 1 - 4 and 6-7 wherein they, together with genetic material (e.g. plasmids), therapy genes, antisense oligonucleotides, ribozymes or gene diagnostic agents, contain cationic complexes suited for the transfer of genes.

12. Method for the preparation of specific magnetosomes according to claims 1

to 4 wherein they are isolated from the magnetic bacterium *magnetospirillum gryphiswaldense* using a simple culture medium which does not contain complexing agents for iron, with the oxygen concentration in the medium being maintained below 2 %, later Na acetate and  $\text{FeSO}_4$  being added, the magnetic cells being gathered by centrifugation and subsequently after lysis of cells the magnetosomes being obtained by separation of the cell fragments and cell sap by means of a permanent magnet in a magnetic separation column.

13. Use of specific magnetosomes according to claims 1- 4 and 6 -7 as NMR contrast agent.

14. Use of specific magnetosomes according to claims 1 -5 for purging ( taking out diseased cells ).

15. Use of specific magnetosomes according to claims 1- 4 and 6 -7 as diagnostic agents for tumour diseases or in lymphography, for inflammatory processes, for multiple sclerosis, Alzheimer disease and Parkinson s disease.

16. Use of specific magnetosomes according to claims 1 - 10 as a therapeutic agent against tumoral diseases, inflammatory processes and metabolic diseases.

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